

CLAIM AMENDMENTS

In the Claims: Please cancel claims 1-50 and amend claims 58, 69 and 63 as shown.

A complete claim listing, as required, follows:

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58. (currently amended) A product for detecting flaws in electrically conductive specimens, comprising:

a coil for inducing an electromagnetic field in a specimen;
at least two coplanar magneto-resistive sensors, each magneto-resistive sensor having a sensitive axis in the plane and measuring the electromagnetic field along the sensitive axis and a third sensor for measuring the electromagnetic field ~~field~~ in a direction perpendicular to the plane.

59. (currently amended) A product according to claim 58 ~~56~~, wherein the at least two coplanar magneto-resistive sensors and the coil are formed on the same substrate.

60. (previously presented) A product for detecting flaws in electrically conductive specimens, comprising:

a coil for inducing an electromagnetic field in a specimen;
at least two coplanar magneto-resistive sensors, each magneto-resistive sensor having a sensitive axis in the plane and measuring the electromagnetic field along the sensitive axis and a third sensor for measuring the electromagnetic field in a direction perpendicular to the plane, and wherein the at least two coplanar magneto-resistive

sensors, the third sensor, and the coil are formed on a substrate.

61. (previously presented) A product for detecting flaws in electrically conductive specimens, comprising:

a coil for inducing an electromagnetic field in a specimen; and

at least two coplanar magneto-resistive sensors, each magneto-resistive sensor having a sensitive axis in the plane and measuring the electromagnetic field along the sensitive axis, wherein the at least two coplanar magneto-resistive sensors comprise giant magneto-resistive sensors orthogonally arranged about a central point and arranged external to the coil, with the coil also having an axis of symmetry about the central point, the axis of symmetry of the coil being orthogonal to the plane of the sensors.

62. (previously presented) A product for detecting flaws in electrically conductive specimens, comprising:

a coil for inducing an electromagnetic field in a specimen; and

at least two coplanar magneto-resistive sensors, each magneto-resistive sensor having a sensitive axis in the plane and measuring the electromagnetic field along the sensitive axis, wherein the at least two coplanar magneto-resistive sensors comprise giant magneto-resistive sensors orthogonally arranged about a central point, the coil also having an axis of symmetry about the central point, the axis of symmetry of the coil being orthogonal to the plane of the sensors, with the giant magneto-resistive sensors and the coil formed on a substrate.

63. (currently amended) A product for detecting flaws in electrically conductive specimens, comprising:

a coil for inducing an electromagnetic field in a specimen; and

at least two coplanar magneto-resistive sensors, each magneto-resistive sensor having

a sensitive axis in the plane and measuring the electromagnetic field along the sensitive axis, and a *Hall effect* sensor for measuring the electromagnetic field in a direction perpendicular to the plane, wherein the at least two coplanar magneto-resistive sensors comprise giant magneto-resistive sensors orthogonally arranged about a central point, with the coil also having an axis of symmetry about the central point, the axis of symmetry of the coil ~~on~~ being orthogonal to the plane of the sensors.

64. (original) A product for detecting flaws in specimens, comprising:

a plurality of devices, each device comprising at least one coil and at least one two-dimensional magneto-resistive sensor, the at least one coil for inducing an electromagnetic field in a specimen, the at least one two-dimensional magneto-resistive sensor comprising a first magneto-resistive sensor and a second coplanar magneto-resistive sensor, the first magneto-resistive sensor and the second magneto-resistive sensor each having a sensitive axis in the plane and measuring the electromagnetic field along the sensitive axis,

wherein a flaw creates a perturbation in the induced electromagnetic field, and the at least one two-dimensional magneto-resistive sensor detects this perturbation.

65. (original) A product according to claim 64, wherein each device further comprises a third sensor measuring the electromagnetic field in a direction perpendicular to the plane.

66. (original) A product according to claim 64, wherein the plurality of devices are arranged in a one-dimensional array.

67. (original) A product according to claim 64, wherein the plurality of devices are formed on a substrate.

68. (original) A product according to claim 64, wherein the plurality of devices are arranged in a two-dimensional array.

69. (original) A product according to claim 68, wherein the plurality of devices are formed on a substrate.

70. (original) A product according to claim 68, wherein the at least one two-dimensional magneto-resistive sensor comprises giant magneto-resistive sensors orthogonally arranged about a central point, with the at least one coil having an axis of symmetry about the central point, the axis of symmetry of the coil being orthogonal to the plane of the sensors.

71. (original) A product according to claim 68, wherein the at least one two-dimensional magneto-resistive sensor and the coil are formed on a substrate.

72. (original) A product according to claim 68, wherein each device further comprises a *Hall effect* sensor measuring the electromagnetic field in a direction perpendicular to the plane, with the at least one two-dimensional magneto-resistive sensor, the *Hall effect* sensor, and the coil formed on a substrate.

73. (original) A product according to claim 64, wherein the plurality of devices are arranged in a three-dimensional array, the three-dimensional array comprising a stack of two-dimensional arrays, each two dimensional array comprising at least one device formed on a substrate.

74. (original) A product according to claim 73, wherein the at least one two-dimensional magneto-resistive sensor comprises giant magneto-resistive sensors orthogonally

arranged about a central point, with the at least one coil also having an axis of symmetry about the central point, the axis of symmetry of the coil being orthogonal to the plane of the sensors.

75. (original) A probe for detecting a flaw, such as a crack, at an edge of an electrically conductive specimen of a specific shape, comprising:

an excitation coil similarly shaped to the specimen for inducing eddy currents in the specimen; and

at least one magneto-resistive sensor located above the edge of the specimen, the at least one magneto-resistive sensor having a sensitive axis tangentially-aligned with the edge of the specimen,

wherein the flaw at the edge creates a perturbation in the induced eddy currents, and the at least one magneto-resistive sensor detects this perturbation.

76. (original) A probe according to claim 75, wherein the magneto-resistive sensor comprises giant magneto-resistive sensors.

77. (original) A probe according to claim 75, wherein the magneto-resistive sensor comprises spin dependent tunneling sensors.

78. (original) A probe according to claim 75, further comprising an array of magneto-resistive sensors, each magneto-resistive sensor in the array having a sensitive axis tangentially-aligned with the edge of the specimen.

79. (original) A probe according to claim 78, wherein each magneto-resistive sensor in the array comprises giant magneto-resistive sensors.

80. (original) A probe according to claim 78, wherein each magneto-resistive sensor in the array comprises spin dependent tunneling sensors.

81. (original) A probe according to claim 78, wherein the array of magneto-resistive sensors has a circular shape.

82. (original) A probe according to claim 78, wherein the array of magneto-resistive sensors is formed on a substrate.

83. (original) A probe according to claim 75, wherein the excitation coil has a circular shape.

84. (original) A probe according to claim 75, further comprising means for biasing the magneto-resistive sensor to compensate for the earth's magnetic field.

85. (original) An eddy current probe for detecting a flaw in an electrically conductive specimen, comprising:

a coil for inducing eddy currents in the specimen, the coil having a cross-section and an axis of symmetry within a plane of the cross-section; and

a magneto-resistive sensor having an axis of sensitivity coplanar with the cross-section and orthogonal to the axis of symmetry, with the magneto-resistive sensor disposed on the axis of symmetry and at least one of i) exterior to the coil and ii) interior to the coil,

wherein the flaw creates a perturbation in the induced eddy currents, and the magneto-resistive sensor detects this perturbation.

86. (original) An eddy current probe according to claim 85, wherein the magneto-

resistive sensor comprises a giant magneto-resistive sensor.

87. (original) An eddy current probe according to claim 85, wherein the magneto-resistive sensor comprises a spin dependent tunneling sensor.

88. (original) An eddy current probe for detecting a flaw in an electrically conductive specimen, comprising:

a coil for inducing eddy currents in the specimen, the coil having a cross-section and an axis of symmetry within the plane of the cross-section; and

an array of magneto-resistive sensors, with each magneto-resistive sensor having an axis of sensitivity coplanar with the cross-section and orthogonal to the axis of symmetry, the array of magneto-resistive sensors disposed on the axis of symmetry and at least one of i) exterior to the coil and ii) interior to the coil,

wherein the flaw creates a perturbation in the induced eddy currents, and the magneto-resistive sensor detects this perturbation.

89. (original) An eddy current probe according to claim 88, wherein the array of magneto-resistive sensors comprises a giant magneto-resistive sensor.

90. (original) An eddy current probe according to claim 88, wherein the array of magneto-resistive sensors comprises a spin dependent tunneling sensor.

91. (original) An eddy current probe according to claim 88, wherein the array of magneto-resistive sensors is formed on a substrate.

92. (original) An eddy current probe according to claim 88, wherein the cross-section of the coil has a "D" shape.

93. (original) An eddy current probe according to claim 88, wherein the cross-section of the coil has a double “D” shape.

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